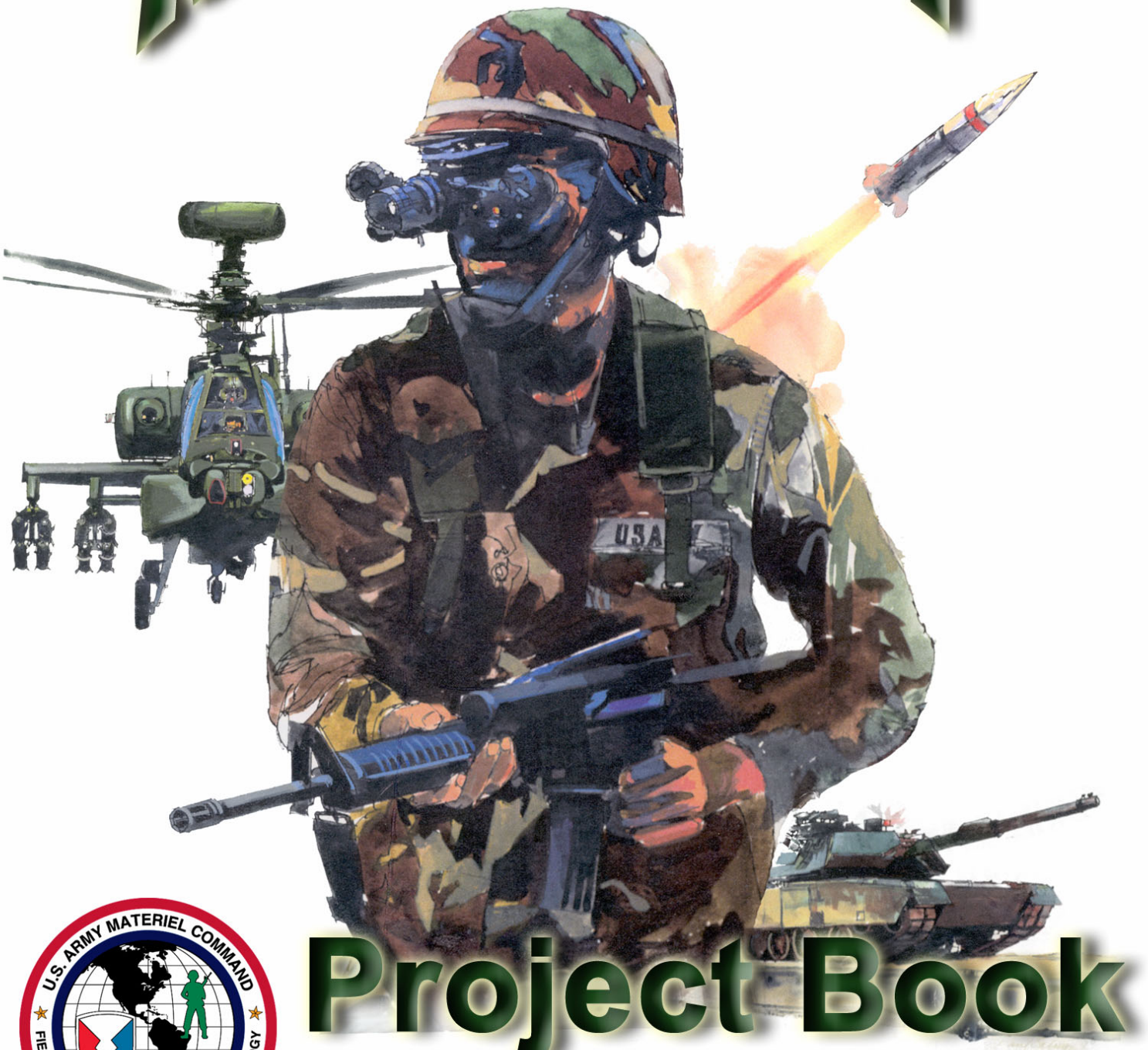
AMC-FAST



U.S. ARMY MATERIEL COMMAND
FIELD ASSISTANCE IN SCIENCE AND TECHNOLOGY

Project Book
2002/2003

revised Feb 03

FOREWARD

2002/2003 Project Book

Since the beginning of the U.S. Army Materiel Command-Field Assistance in Science and Technology (AMC-FAST) in 1985, the Activity has initiated over 1200 projects. These projects have contributed greatly to the Army in four main areas: Improvement of Systems Capability, Improvement in Training, Increase in Safety, and Cost Reduction or Avoidance. Early in the development of AMC-FAST, it became clear that many of its projects had utility in organizations other than the originating organization. In fact, many of AMC-FAST projects have resulted in equipment which is now standard throughout the Army. To ensure that maximum benefits would be derived from its projects, AMC-FAST initiated a series of publications describing its projects and providing points of contact. This project book provides a brief description of the problem, proposed solution, status, next step, expected end result and point of contact. The projects presented in this book include all on-going projects, and some recently closed projects which are deemed to still be of current interest. Recently submitted project proposals are pending and will be included in the next issue.

We sincerely hope that this book will be of use to our Army in the field and to the research, development and acquisition community. Your comments and suggestions on this publication, as well as the AMC-FAST Activity are most welcome.

James F. Gibson

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Project Book

Projects (cont'd)

James F. Gibson, Director

James F. Gibson became Director of AMC-Field Assistance in Science and Technology Activity (AMC-FAST) on 24 June 1996. Mr. Gibson, a Government Scientist and R&D Manager for more than 25 years, was born in New York City. Following his undergraduate work in Physics at the Polytechnic Institute of Brooklyn, he received an ROTC commission in the U.S. Army and continued his studies at the University of Arizona where he was a Ph.D. candidate and a Graduate Teaching and Research Assistant. Mr. Gibson served on active duty as a Research Physicist, and later, in 1968, as an Army Captain, he commanded a joint USA-USMC Target Acquisition Unit along the DMZ in Vietnam.

In 1969, Mr. Gibson joined the U.S. Army Combat Surveillance and Target Acquisition Laboratory where he was responsible for the development of advanced acoustic and electro-optical target acquisition equipment. He undertook additional graduate studies and received an MS Degree in Electrical Engineering in 1974. During his career, Mr. Gibson has held scientific and engineering positions at the Cold Regions Research and Engineering Laboratory; White Sands Missile Range; Electronic Proving Ground, Ft. Huachuca; Ft. Belvoir; and Ft. Monmouth.

From 1978 to 1989, Mr. Gibson held a variety of positions at the U.S. Army Center for Night Vision and Electro-Optics (CNVEO) at Ft. Belvoir, VA, progressing from Team Leader in the Laser Division to Director, Advanced Concepts Division, Special Projects Officer, Director, Infrared Technology Division, and lastly, as Associate Director of CNVEO. As Associate Director, he supervised all support to forward offices in Germany and Korea, SOF operations, support for the AMC-FAST program, and international programs, as well as program planning and management. From 1989 through 1992, Mr. Gibson was Chief Science Advisor to the Commander-in-Chief, United States Forces Korea and Eighth U.S. Army. He was assigned to CECOM RDEC from 1992 to 1995, where he established the Digital Integration Laboratory. He received an MS Degree in National Security Strategy from the National War College in 1996.

Mr. Gibson has served as a consultant to DOD, NASA, DEA, FBI, the U.S. Secret Service, and has been responsible for technology exchange programs between the U.S. and U.K., Japan and France. He was the standing Chairman of the ABCA (Australia, U.K., Canada, U.S.) Quadripartite Working Group on Surveillance, Target Acquisition and Night Observation, and chaired Joint Technical Coordination Groups on the Industrial Base.

Jim Gibson is a Commercial Pilot with multiengine, seaplane, glider and instrument ratings. He presently holds FAA Advanced and Instrument Ground and Flight Instructor certificates. He is married to the former Maria Kang and has five children: Anne, Jim, Christine, Catherine and Mary Claire.

John P. Grills, Deputy Director

John Grills comes to AMC-FAST from the U.S. Army Research Laboratory (ARL) in Adelphi, MD, where he served in various engineering positions for 19 years. Most recently was the ARL Liaison Officer to the SAAL-ZT Office of the Assistant Secretary of the Army for Acquisition, Logistics & Technology (ASA (ALT)). Prior assignments: Chief of the Special Projects Office in the ARL Information Science and Technology Directorate. He was primarily responsible for executing demonstration projects that promoted ongoing R&D in Information Systems to a broad customer base. He also served as the Technical Lead on an extranet project which supported distributed collaboration with Industry, Academia, and Other Service Labs for the Army After Next project; Science Adviser (SA) to the Commander, Alaskan Command (ALCOM), Elmendorf AFB, Alaska; SA to the Commander, U.S. Army Alaska and 6th Infantry Division, Ft. Wainwright AK; Mechanical/Electronics Engineer, Harry Diamond Laboratories, Adelphi, MD.

Areas of technical expertise include: Robotics, Battlefield Visualization and GIS, Command & Control software development, software/hardware architectures, embedded systems design and programming, High Performance Computing, Computational Fluid Dynamics (CFD) modeling and simulation, Fluidics, electro-mechanical sensor design and systems integration, automated data processing, signal processing, hybrid navigation systems, systems and network management, and technical program management. Mr. Grills holds a BS Degree in Biomedical Engineering from the Catholic University of America (1981), has completed numerous post graduate specialized coursework at University of MD and M.I.T., and is a Level III qualified (Systems Planning, Research Development & Engineering) member of the Army Acquisition Corps. Other personal interests include auto mechanics and restoration, woodworking, and Open Software Development.

His wife, Ann Marie, is an artist, Graphics/Prepress Designer, and Landscape Designer. They enjoy outdoor activities including: camping, skiing, softball, sailing and golf.

2002/2003
Project Book

COMMUNICATIONS

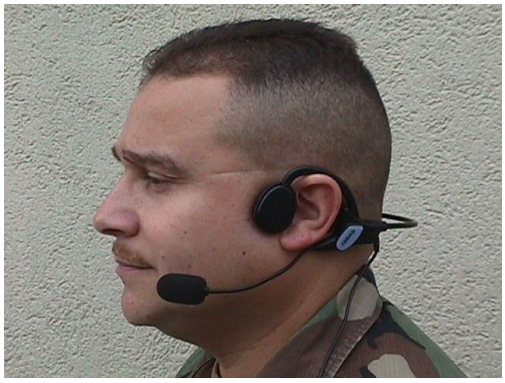
Brigade Engineer's Communications in Noisy Operational Environments

Project: 1066

(Closed)

PROBLEM: 173rd Airborne Brigade Combat Engineers are seeking technology that would allow communications between heavy equipment operators (dozer operators wearing Kevlar Helmets and single E.A.R. plugs protection) and Engineer supervisors on the ground. Currently, these Engineer units have no communication capabilities other than hand signals (after they get the operators attention by walking into the operators field of view). The Army issues short-range Soldier Intercom (SI) Radios (with standard air conduction headsets) to infantry squads but these systems are not currently issued to Engineer units. The 173rd Brigade Engineers are seeking a communication system that is similar in concept to the SI, but their system would need the capability to allow communications in high noise environments, a capability that the standard SI system, with air-conduction microphone and speaker headset, does not provide.

SOLUTION: A SI type radio with a bone conduction (speakers) headset may offer the capability to Communicate in the Engineer's heavy equipment environment. The head set solution must be compatible with the Kevlar helmet and the Army's current E. A. R. hearing protection devices. Direct communications was initiated with the PM Soldier Office (the SI radio Proponent) for initial project coordination and identification of potential SI compatible bone-conduction headset technology. Subsequently, it was determined that while potential COTS technology was available, selected system testing would be required to adequately determine viability in high noise, heavy equipment operating environments.



Bone-conduction headset

STATUS: The Army Research Laboratory, Human Research & Engineering Directorate's Audio Performance Branch executed a Market Survey, procurement and testing of viable bone conduction headset technology within HRED's Hostile Environment Simulator (HES). Based upon this research, two (2) different types of bone conduction headsets were provided to the Brigade Engineers in November 2001 for field evaluation.

The Brigade Engineers conducted field evaluations of the two headsets during the Spring '02 Graf training rotation and provided an outstanding report identifying the TEMCO HG-18 Bone-conduction headset as providing the best capability of the two items for supervisors to communicate with equipment operators during heavy equipment operations. Project is complete.

NEXT STEP: This project is complete.

END RESULTS EXPECTED: It is expected that this technical evaluation will establish the feasibility of exploiting the inherent capabilities of bone-conduction technology to support communications between heavy equipment operators (dozer operators wearing Kevlar Helmets and single E.A.R. plugs protection) and Engineer supervisors on the ground. This information could then be provided to PM Soldier as a possible SI Radio option for Army-wide employment.

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Collapsible Ku-Band Antenna
Project: 1031

PROBLEM: Combat Weather Teams use the Tactical Very Small Aperture Terminal (T-VSAT) system to receive weather information when deployed. T-VSAT uses a rigid 1-meter dish that is bulky and hard to carry. This antenna takes up too much airframe space, and requires a minimum crew of two to set up. The FORSCOM Staff Weather Office (SWO) wants a more deployable system. The FORSCOM SWO also wants a T-VSAT system that can both receive and transmit information. The current system is receive-only.

SOLUTION: An initial survey of antenna vendors found no suitable candidate in the Ku-Band. A Commerce Business Daily (CBD) announcement was prepared, and advertised through PM T-VSAT. Two potential candidates were found, and a fly-off was conducted by Combat Weather Command in Hurlburt Field, FL. The MTI prototype was deemed worthy of development. The MTI antenna is a collapsible satellite dish that weighs about 20 pounds. When placed in its canister (9" diameter x 5' long) one person can carry it. The antenna uses a special type of metallically impregnated cloth to effect its pliability and reception characteristics.

STATUS: AMC-FAST purchased one of these antenna prototypes through PM T-VSAT and provided it to the 1st Weather Squadron at Ft. Lewis, WA for evaluation. PM-TVSAT purchased two more of these antennas: one for follow-on tests by Combat Weather Command, and the second for use by its prime integrator, Raytheon Corp. The antenna was featured at two FORCOM SWO Conferences, and received favorable comments by Combat Weather Team members. Tests at Combat Weather Command have validated the utility of this antenna. The 1st Weather Squadron provided an extremely helpful written evaluation of the antenna.

NEXT STEP: MTI has extended their antenna from a receive-only unit to a receive-transmit unit. The space segment will allow a low-bandwidth back-channel. We plan to purchase a two-way T-VSAT with this new antenna to conduct more evaluations.

END RESULTS EXPECTED: PM-TVSAT has purchased thirty-four of these collapsible satellite dish antennas; thirteen of these are for IMETS-Light. We plan to validate FORSCOM's requirement for a two-way T-VSAT system. This will require a collaborative effort to work out security accreditation issues.

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News Filter
Project: 1057

PROBLEM: The Forces Command (FORSCOM) Operations Center tries to track late-breaking news on disasters and other events that may affect FORSCOM units. They do not have the time or manpower to continuously monitor television news.

SOLUTION: A set of equipment that monitors closed captioning for key words, records relevant footage, and disseminates the video has been specified and procured for evaluation.

STATUS: Equipment has been delivered. We will integrate it into the desired system and initiate operational evaluation. System build is underway.

NEXT STEP: FORSCOM Public Affairs Office (PAO) has expressed some interest in this capability.

END RESULTS EXPECTED: The FORSCOM Operations Center has agreed to maintain this system if they find it useful. The objective is to make this capability one more component of their data stream.

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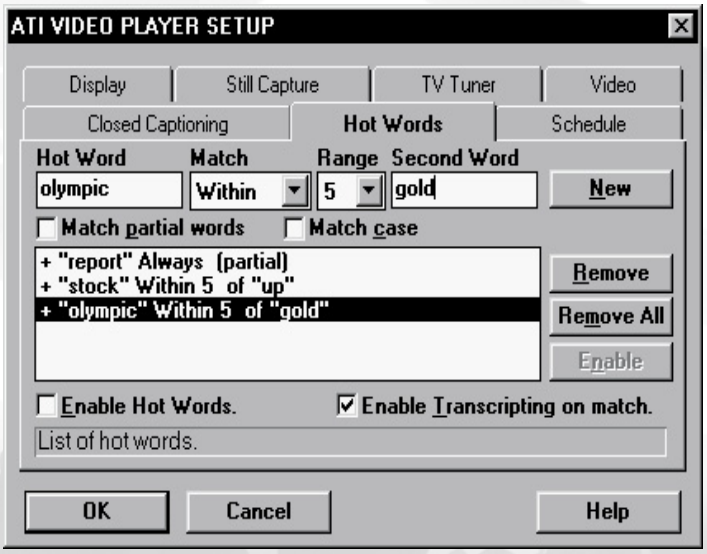

Example of keyword search criteria for closed captioning stream.

Rapid Audio Phrases

Project: 1022

(Closed)

PROBLEM: There are a very limited number of linguists to cover the numerous requirements for interpreters.

PROPOSED SOLUTION: Provide a simple device to play prerecorded instructional phrases to free linguists from the requirement of reading simple instructions.

– Phrases are recorded on minidisc by a linguist.
– New phrases can be added anytime and anyplace.
– Soldier selects a phrase from a hard copy list or from track list on player.
– Soldier plays phrase by playing that track.
– Advantages
  - New Phrases can be added at any time in the field.
  - Soldier uses low cost ($300) rugged walkman type device for playback with speakers.

STATUS: A demonstration tape with a number of example phrases was made in German. Several commercial units have been bought and distributed to Science Advisors at USFK, SETAF and ALCOM

NEXT STEP: With the development of the DARPA Two Language Translator this equipment is no longer required. For that reason this project is closed.

END RESULTS EXPECTED: Improved communication with foreign nationals.

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UH-60A Communications Upgrade

Project: 1036

(Closed)

PROBLEM: A request was received from the 54th Medical Company (Air Ambulance) to assist in improving communications with civil authorities such as the State Police, National Park Service, Sheriffs Department, and other search and rescue activities during civilian support missions involving the transport of injured personnel. Direct communication with ground-based personnel during an emergency is essential in expediting the recovery and transport of injured personnel. Military radios installed on the UH-60 aircraft are frequency incompatible with the frequencies assigned to civil organizations.

SOLUTION: A commercially available VHF FM radio, the Northern Airborne Technology NPX138, was determined to have the desired characteristics to fulfill this need. To ensure optimal performance the installation of a compatible folded dipole antenna was also identified. The NPX138 radio was installed in an existing space adjacent to the standard military radio and integrated into the aircraft intercom system so that the crew could easily switch between military and civil frequencies. This project is being carried out in coordination with the CECOM Electronic Sustainment Support Center at Ft. Lewis.

STATUS: Radios and antennas have been installed in two UH-60A aircraft and an Air Worthiness Release has been approved by US Army Aviation and Missile Command for Visual Flight Reference (VFR) operations. Both aircraft are performing operational missions using the new radio. Based upon the positive results of the user field evaluation, additional radios were obtained by the unit so that all aircraft will have the additional capability.

NEXT STEP: AMC-FAST activity with this project has been completed and the project will be closed. Actions required by other organizations include the approval of an unrestricted AWR and incorporation of a requirement for an additional radio into updated requirements for the UH-60Q aircraft.

END RESULTS EXPECTED: Enhanced operational capability of MEDEVAC aircraft assigned to the Active, Reserve and National Guard components during Military Assistance in Safety and Traffic (MAST) operations. This project is complete.

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2002/2003
Project Book

FORCE PROJECTION

Smart Book
Project: 1035

PROBLEM: The Forces Command (FORSCOM) Secretary of the General Staff (SGS) wanted a book that advised deployed commanders on materiel options for: tents, heaters, flooring, and kitchens.

SOLUTION: Mr. Frank Kostka of the US Army Soldier & Biological Chemical Command (SBCCOM), Natick Soldier Center was contacted. Mr. Kostka's team provided a Smart Book that contains product information on: Field Services (showers, kitchens, and burners), Shelters, Heaters (both powered and non-powered), Generators and Power Distribution Systems, and Military Operations in Urban Terrain (MOUT) Equipment.

STATUS: The Smart Book and accompanying CD-ROM were distributed to General Officers at the FORSCOM Commanders Conference. GEN Hendrix (CG, FORSCOM) requested that copies of the CD-ROM be sent to every brigade commander within FORSCOM.

Mr. Kostka and his team at the Natick Soldier Center prepared an expanded version of the Smart Book for the September 2001 FORSCOM Commanders Conference (FCC). This FCC was cancelled due to the 11 September attacks. However, the Smart Book was mailed to each commander.

NEXT STEP: We are in the process or re-publishing this Smart Book for early March 2003.

END RESULTS EXPECTED: That Brigade Task Force Commanders have a reference of rapidly available equipment in case of a deployment.

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Mobile Kitchen Trailer – Improvement
A summary description about 100 items like
this is contained in the Commanders' Smart Book.

FORCE PROTECTION

Entry Point Screening for Large Vehicle Bombs

Project: 976A

(Closed)

PROBLEM: The CofS of V Corps requested that new technology equipment be installed at the West vehicle gate entering Eagle Base, Tuzla, Bosnia that would have the capability to search the cargo compartments of large trucks for the presence of a large explosive device.

SOLUTION: The Technical Support Working Group (TSWG) identified a commercial system with this capability that is currently being used by U.S. Customs at various U. S. ports.

STATUS: The TSWG awarded a development contract to SAIC Corp to repackage their existing (commercially available) Mobile Vehicle And Cargo Inspection System (VACIS) onto a HMMWV vehicle such that the entire system would then be C130 aircraft transportable. SAIC has completed fabrication of the Military Mobile VACIS system and it is currently undergoing operational testing at the Thunder Mountain Evaluation Center (TMEC), Ft Huachuca, AZ. The VACIS system has been in continuous operation at Camp Bondsteel, Kosovo since September 2001 and things are working fine.

NEXT STEP: Upon completion of operational testing in August 2001, the system will be fielded to Task Force Falcon (TFF) in Kosovo for an operational evaluation.

END RESULTS EXPECTED: A final report will be written at the end of the operational evaluation.

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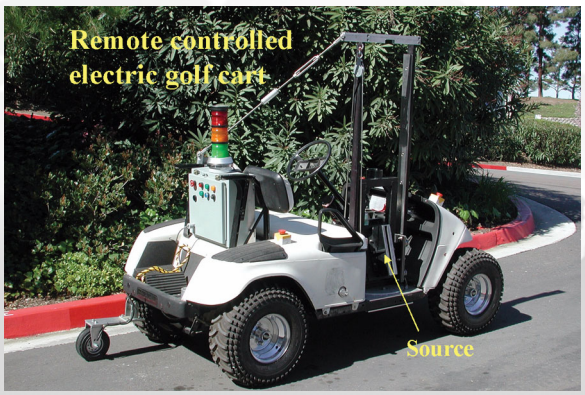

Manportable Explosives Detection

Project: 1004

PROBLEM: The 1st Battalion, 1st Special Forces Group (1st BN/1ST SFG(A)) at Torii Station, Okinawa, Japan has a requirement for equipment that can reliably search vehicles for a variety of explosives. The equipment must be one man portable, require minimal calibration, and minimal maintenance. It is desirable that the equipment weigh less than eight pounds.

SOLUTION: Industry has several systems to offer, however, testing of these systems by the Naval Facilities Engineers, Port Hueneme, CA indicates that none of the existing commercial systems can either detect the family of explosives, nor are they reliable enough in changing weather. Some of the units are too large and expensive. The 1st BN/1st SFG(A) needs to be able to test new systems as they become available to find an affordable and reliable solution.

STATUS: The Naval Facilities Engineers (NFE) has developed a prototype system that will combine four or five sensors into a single "man portable" battery operated system. Basic funding for the project is from the J34 (Anti-Terrorism Project Office) of OSD and the tri-service Physical Security Equipment Advisory Group (PSEAG). The J34 will sponsor the field testing of the system; however, there is an application process that is required. The Project Manager (PM) for NFE is Mr. Andrew Varnava.

NEXT STEP: "In house" unit to be tested by 1st/1st to assess applicability of new COTS to 1st/1st needs. NFE received feedback from Okinawa and is presently preparing a report. NFE is also supplying a kit to Pearl Harbor. Monitor use at Pearl Harbor and provide report to NFE when available.

END RESULTS EXPECTED: Make available to 1st/1st a portable - one man operable - reliable explosives detector for vehicle search. NFE will incorporate comments into future deliveries.

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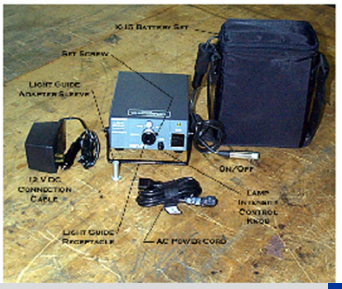
Fiberscopes

Mirrors

Videoscope

Video capture devices

Light Source



OPFOR View

Project: 1082

PROBLEM: The Vipers have proposed recording video from the M60 thermal sight on selected Opposing Forces (OPFOR) tanks. This will provide the training unit the "other guy's" perspective on the battle.

PROPOSED SOLUTION: NVESD will provide an optical splitter integrated with a commercial imager and a recording system for demonstration to the Vipers. As a spin-off demonstration, two more systems will be designed to be compatible with the TOW sight for TOW training. This has the potential additional application for surveillance using TOW sights.

STATUS: NVESD has designed an optical splitter for the Bradley gunnery training that is compatible with the M60 sights. The thru sight was successfully tested at Aberdeen Proving Grounds in November 2001. NVESD demonstrated the system to the Vipers in early December 2001. However, there were technical problems.

NEXT STEP: NVESD is developing a thru sight for the Bradley. When this is developed it will be demonstrated on at CMTC.

END RESULTS EXPECTED: The ability to see their actions from the enemy's perspective during the AAR will enable the soldiers to enhance their survivability during battle.

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Panoramic Videocam

Project: 1038

(Closed)

PROBLEM: Automatic surveillance systems do not provide full 360-degree coverage needed for Force Protection Systems.

SOLUTION: Use a hemispherical imaging lens or mirror that gives a 360-degree view and will fit on a standard video camera.

STATUS: Started June 2000. Science Advisor contacted Mr. Al Van Landuyt at CECOM/NVESD, Dr. John Eicke at ARL, and Prof. Greguss at the Budapest University of Technology & Economics. Set up joint project with ARL. SBCCOM and other Army POCs contacted. Demonstrated a Panoramic Annular Lens (PAL) camera at USAREUR Symposium 2000. Set up test and demo with 165th MI Bde in Darmstadt. Located four COTS systems, others exist. Selected a COTS system and specified additional custom system. Procured both, received hardware. Obtained high-performance laptop and special connector. Tested PAL lens system and determined need for software operating system revision. Sent PAL system back, had revisions made and returned. Both systems fully operational. 165th Bde delayed field trial due to schedule issues.

December 2001 – April 2002: Fielded tested by 165th MI Bn in both garrison and during field exercise conditions. Received evaluation which included both positives, negatives and recommendations for an improved system: 1. Don't need streaming video. Still pics are OK. 2. Refractive lens has too much light glare, need a small shielded reflective panoramic system. 3. Better software interface. 4. More camera resolution.

April 2002: Field Trial use by the 154th MI Bn from 17 Dec 2001 – 23 April 2002. Mixed review. No significant interest could be found for the system.

NEXT STEP: This project is complete.

END RESULTS EXPECTED: Determination of actual value of panoramic system in realistic field conditions.

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Thermal Cameras and Intrusion Detection Devices for Bosnia and Kosovo

Project: 1063

(Closed)

PROBLEM: The Task Force Eagle (TFE) Chief of Staff has a requirement to augment the existing perimeter defense around Eagle Base, Camp McGovern and Camp Commanche in Bosnia. Recent reductions in total authorized troop strength in Bosnia have resulted in a reduction in the number of soldiers available for guard duty. The Task Force Falcon (TFF) Chief of Staff is interested in the possibility of reducing the size of his current guard force.

SOLUTION: CECOM NVESD was requested to travel to both Bosnia and Kosovo to demonstrate a variety of hardware systems (fixed and remotely operated day and thermal cameras, and intrusion detection devices) that could upgrade the ability of the current guard force to monitor long stretches of the perimeter fence line for intruders.

STATUS: A variety of commercial hardware was demonstrated in Bosnia, Kosovo and Macedonia by a joint NVESD/USAREUR team in March 2001. Site surveys of each camp were completed and a detailed cost proposal has been prepared by CECOM NVESD. It was decided by USAREUR that the new system would be designed by NVL and installed by Brown & Root. There was no oversight of installation by NVL. Poor installation resulted in the system being nonfunctional.

September 2002: USAREUR SA and NVL representative returned to Eagle Base to review and inspect the nonfunctioning system. Extensive reports on its deficiencies and problems were submitted by both. Repairs were made under supervision of NVL. Correctly operating system is in place.

NEXT STEP: This project is complete.

END RESULTS EXPECTED: CECOM NVESD personnel will assist with the procurement of the hardware, supervise the on-site installation by Brown and Root and conduct operator training.

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LOGISTICS and MAINTENANCE SUPPORT

Arctic Water Distribution

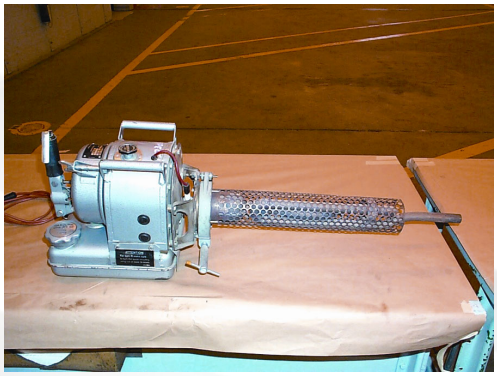
Project: 948a

(Closed)

PROBLEM: The 600 GPH Reverse Osmosis Water Purification Unit (ROWPU), trailer mounted with a 30 KW generator is used to purify water in the arctic and other places. Due to the fact that the unit can not be completely drained, the trapped water will freeze, when the unit is exposed to subfreezing temperatures. This occurs mainly when the ROWPU is transported from one field site to another and usually results in serious damage to the membranes. The unit is very costly to repair once it is damaged.

SOLUTION: When freezing weather is anticipated, remove the ROWPU from its trailer and secure it in the back of a 5-ton truck. Modify the PC heater and cargo tarp. Two heaters need to be installed in the cargo bed, a primary and backup. Once the vehicle arrives at the new field site, a Herman Nelson unit could take over and provide heated air through a duct in the tarp into the cargo area.

STATUS: The Arctic Oasis prototype was made from an M1 Flatrack pallet enclosed with painted camouflage plywood on the top and sides and insulated to minimize heat loss. Inside are two 500 gallon water blivets (secured to the box floor), a distribution pump, and a commercial "torpedo" heater. It is loaded onto a Palletized Load System (PLS) for distribution to field locations. The Arctic Oasis was built and fielded by the 172 Support Bn and has been working satisfactorily without any problems with the ROWPU.



NEXT STEP: This project is complete.

END RESULTS EXPECTED: A working solution to prevent the freezing of the ROWPU under arctic conditions when relocating from one field site to another.

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Corrosion Prevention (Rotor Craft) "Birdbath"

Project: 1006

PROBLEM: When the unit rotor craft (UH60 Blackhawks, OH58D Kiowa Warriors and CH47 Chinooks) return from an exercise, they are covered with salts and acids picked up from the local environment. This contamination promotes rust and corrosion. If contamination is not removed effectively, the corrosion can red line the equipment. Costs of corrosion to the helicopter fleet at Wheeler Army Airfield is estimated at $18M annually.

SOLUTION: 1.) Design and budget an effective wash facility (aka "birdbath") for Wheeler Army Air Field (WAAF) 2.) Install a birdbath facility and cause all rotor craft to process through the facility upon return from an exercise before being refueled.

STATUS: AMCOM has designed a standard Clean Water Rinse Facility that can be tailored to any installation. Cost of the facility is $2.1M. USARPAC and 25ID(L) have been briefed on the facility.

NEXT STEP: Work with 25 ID(L) to determine priority of this un-funded program and to determine the best site location.

END RESULTS EXPECTED: Reduced cost of ownership and increased availability of rotor craft due to reduction in unscheduled maintenance.

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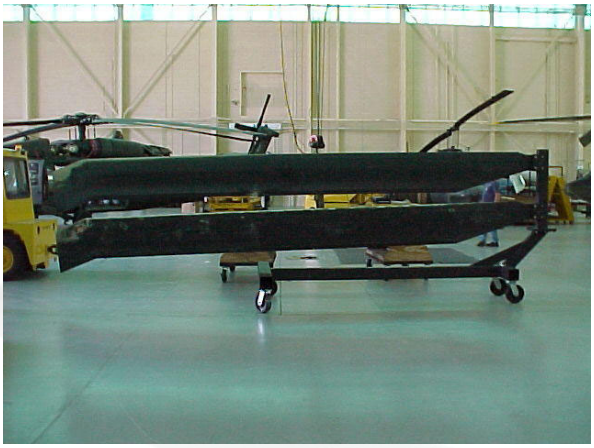
Helicopter Main Rotor Blade Painting

Project: 1054

PROBLEM: Simmons Army Airfield, Ft. Bragg, NC, paints over 300 helicopter main rotor blades as part of its maintenance procedures a year. This is currently done in a two-step process: one side of the rotor blade is painted and allowed to dry. The rotor blade is then turned, and the other side is painted and allowed to dry. This is an unduly time consuming process.

SOLUTION: Mr. Mike Todd of U.S. Army Aviation and Missile Command (AMCOM) has designed a fixture that will allow painting of the main rotor blade in one pass.

STATUS: The fixture has been designed. The AMCOM Prototype Workshop has fabricated it. The prototype has been delivered to Simmons Army Airfield, and evaluated with a variety of helicopter main rotor blades. Information from this evaluation was collected, and used to fabricate a second, improved fixture. Both prototypes remain at Simmons, where they are still in use.



NEXT STEP: We are preparing an information sheet for distribution to the LAR community.

END RESULTS EXPECTED: A significant savings in the time needed to paint main rotor blades.

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Oil Reutilization

Project: 839A

(Closed)

PROBLEM: Equipment developed by TACOM's National Automotive Center (NAC) and originally demonstrated at III Corps blends used engine oil with JP-8 and returns the mix to the vehicle's fuel tank. This saves the cost the replaced JP-8 and avoids disposal cost of waste oil. The JP-8 blending system provides substantial savings in oil disposal and fuel costs while being environmentally friendly. NAC requested that the 7th Science Advisor investigate the use of the equipment in Germany.

PROPOSED SOLUTION: The SA determined that the fuel blend meets Germany's environmental standards; he contacted several motorpools to request their assistance. The Blacksheep motorpool was selected because of the volume of vehicles they service.

STATUS: NAC trained the Blacksheep mechanics on the operation of the two types of fuel blending machines. The equipment was displayed at USAREUR symposium. There was significant interest in using this equipment USAREUR wide. The Blacksheep began their evaluation in May 2001 to determine ease of use and benefits of equipment. Displayed at USAREUR symposium in September 2002. Eagle Base in using this equipment to reduce disposal costs.

NEXT STEP: Several units are now using the equipment. The G4 and other interested parties at Grafenwoehr have all attended demonstrations. It is now up to these offices to determine if using the equipment at Grafenwoehr meets their requirements. This project is complete.

END RESULTS EXPECTED: Reutilizing waste oil will decrease disposal costs and decrease the amount of JP-8 purchased annually by the amount of waste oil generated. This could provide significant savings for the 7th ATC and USAREUR.

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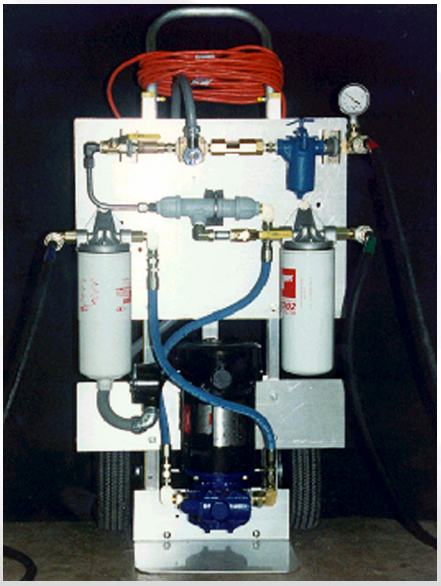

Portable Berms
Project: 1037

PROBLEM: The National Training Center (NTC) has three petroleum, oil, and lubricants (POL) issues that they would like to address. These issues have been raised to FORSCOM DCSLOG staff and Environmental Engineers.

NTC has built a number of concrete berms for their HEMTTs and 5-ton trucks. Although not required by law, they have taken this proactive measure to contain possible oil spills while the vehicle is parked or undergoing maintenance. Unfortunately, many of the berms are cracking, obviating their usefulness for POL containment. They also seek a practical containment system for their fleet of HMMWVs.

NTC has also been recently required by California law to store gasoline in self-locking enclosures. They would like to evaluate commercial storage cabinets with this feature.

Finally, water from their field kitchens sometimes flows into drains. They would like a way of keeping oils from entering the drains along with the wash water.

SOLUTION: A suite of spill containment equipment has been specified and procured. This equipment is being evaluated by the NTC Environmental Office.

STATUS: Equipment was delivered and distributed to field units by the NTC Environmental Engineer Office. The FORSCOM Environmental Engineer Office is being kept apprised of developments. We have outlined the type of final report that is desired and prepared a questionnaire for distribution.

The self-locking gasoline enclosures appear to be working well. We witnessed a contractor demonstration of the spill containment equipment at Hunter Army Airfield, GA and found it most impressive. However, NTC reports that transport of the larger portable berms to the field may be a problem.

NEXT STEP: We would like to expand this evaluation to the 260th Quartermaster Battalion at Ft. Stewart, GA.

END RESULTS EXPECTED: FORSCOM G4 staff is convinced of the utility of this approach. Their focus is still on spill containment, but they are concerned more with refueling operations.

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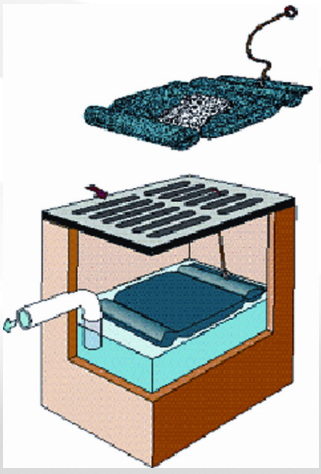

Special Tool for Sheridan Tank

Project Number: 1052

(Closed)

PROBLEM: The 11th ACR Commander, COL Davis, has requested engineering and technical assistance in designing and fielding a special tool for the Sheridan Tank. 11th ACR has a multitude of Sheridan Tanks that require periodic maintenance of the road wheels to include replacement. The process required to change the road wheels in the field is very time consuming and labor intensive. Currently a pit must be dug so as to drive the tank over it and allow the track to sag at the point of the questionable road wheel and the track must be broken or separated to allow the road wheel to be removed. A special tool nicknamed a "Dogbone" due to its odd shape, was designed and fielded for the APC M-113 and the M1. The Sheridan does not have such a tool and one is not available.

SOLUTION: Design such a tool with the unique shape required for the Sheridan using a Computer Aided Design Package, and fabricate such a tool using a state of the art "Water Cutting" table. This equipment is able to cut one-inch steel in any 2 dimensional shape with very little manual labor and will maintain very narrow tolerances from the drawing.

STATUS: The Rapid Prototyping Division of CECOM/NVESD working in conjunction with CPT Delp, Asst. RS-4, 11th ACR has designed and fabricated a special tool for this project. A demonstration was performed at Ft. Irwin with the TACOM Logistics Assistance Representative (LAR) attending. The demonstration was successful and has the support of TACOM Engineering (Tom Allen). The design and fabrication of the proof of concept tool is completed. A safety statement and special use authorization has been given by TACOM and the Ft. Irwin Safety Office. A complete drawing package and a sample run of the special tools has been provided to 11th ACR. This project has demonstrated the capability of computer aided design (CAD) programs and how they can assist field units in design and fabrication of unique tools or devices, saving time and money.

NEXT STEP: Evaluate the special tools provided for possible use by other units.

Final Conclusion: The sample tools were well received and is currently being used. NTC is currently purchasing addition units from a local vender using the drawings provided by the FAST office funding.

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Stabilizing Fire Extinguishers

Project: 1056

(Closed)

PROBLEM: Currently there is no standard method of storing and shipping fire extinguishers at the National Training Center (NTC). The extinguishers are typically laid or stacked unsecured on pallets in a haphazard manner. This creates several safety and environmental hazards. During handling the extinguisher heads may be damaged or loosened, causing leaks or direct danger to the users and handlers. In the case of HALON fire extinguishers the ozone-depleting gas is released into the atmosphere. The highly pressurized canisters can become virtual missiles if the tank is ruptured. Also, damaged extinguishers are expensive to repair or replace. Mr. Vincent of the Army's Acquisition Pollution Prevention Support office indicated that this is an Army wide problem.

SOLUTION: Fort Rucker addressed this problem by fabricating plywood racks to stabilize the extinguishers. A deficiency in this approach is that the cylinder gauges and safety release pins are not visible for inspection. Each rack is custom built, not mass produced and may not have the structural integrity for long term usage. This concept could be improved and expanded for Army wide application by developing storage racks or crates designed for the specific purpose of safe fire extinguisher storage. Injection molded plastic or composite materials similar in design to divided milk crates would solve the problems of pin visibility, standardization and long term durability.

STATUS: A market survey was performed looking for a commercial solution to this problem. Several approaches were studied, the best approach appears to use a pallet formerly used by several automotive manufactures for shipping of parts. The pallet did not provide any packaging dividers or dunnage materials. Further research provided answers, the commercial company has provided custom dividers for this project. A small quantity of pallets and dividers were delivered approximately in September 2001 for further evaluation.

Final Conclusion: The sample containers were tested and now provides viable, cost effective solution for the safe storage and handling of fire extinguishers at military facilities. NTC is currently providing purchasing sources for other military bases to include the Marine Corps.

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Vehicle Rust/Corrosion Program

Project: 583

PROBLEM: The tropical Pacific environment is highly conducive to corrosion of ground vehicles, aircraft, and electronics. The 25ID (L) spent $11.6M, FY79 - FY84, to repair corrosion on 1,919 vehicles. The current program (FY96 - FY98) will spend $5.9M to repair corrosion on 3,700 vehicles. And USARHAW still has 1800+ pieces of equipment in need of corrosion repair.

SOLUTION: 1.) Design/upgrade vehicles/aircraft to avoid problem with corrosion/resistant materials and good designs which seal or encourage runoff. 2.) Cover vehicles/aircraft with a protective rust inhibitor prior to shipment. 3.) Store expensive equipment in dehumidified shelters or dehumidify electronic sections of vehicles. 4.) Make corrosion prevention a high priority in maintenance programs; provide necessary tools, training, and time. All of these - design, materials, preventive measures, storage, and proper maintenance - must be undertaken to alleviate this pervasive problem.

STATUS: A temporary facility now exists on 9 acres of tarmak near Foote Gate at building 2600, a former motor pool. Three bays, plus one oversized bay, are in use processing about 30 pieces of equipment per day. This rate allows an annual treatment of all participating vehicles and ground support equipment. The decision for a permanent facility location was approved 10 December 2001, but lack of funds has prevented a facility upgrade to improve efficiency and add a corrosion repair capability.

NEXT STEP: Continue to treat vehicles and maintain the corrosion data base for input to new vehicle design and/or modification. Conduct analysis to ensure vehicle treatment provides cost benefits. When analysis is complete, compete for funds to upgrade facility. Also, support University of Hawaii program to test various materials and corrosion treatments to improve vehicle design.

END RESULTS EXPECTED: A significant reduction in the cost of ownership of ground equipment by reducing the amount and cost of unscheduled maintenance. Improved availability and longer life for vehicles in Hawaii.

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Wastewater Disposal for GuARNG (ROWPU)

Project: 948b

PROBLEM: LTC D. J. Santo Tomas, Chief of Staff, Guam Army National Guard (GuARNG) has need for a system that can treat the backwash from their "Reverse Osmosis Water Purification Unit" (ROWPU) to allow discharge of the backwash back into the local environment. At present, the ROWPU backwash contaminant concentration is too high to meet the environmental constraints for discharge back into the local environment. Some pre or post ROWPU treatment is required to remove oils, greases and heavy metals from the flow.

SOLUTION: A commercially available unit, known as the "Multi Functional Modular Fluid Filtration System" (MMFFS) was designed by the same manufacturer as the ROWPU to function in series with the ROWPU to reduce the contaminants in the discharge flow.

STATUS: AMC-FAST facilitated an arrangement wherein an MMFFS was delivered to the GuARNG for test purposes. The testing, which took place during May 1999 is complete. Analysis of the discharge indicated that the MMFFS did not remove metals. Guam Environmental Protection Agency (EPA) were participants in the testing and, although the Guam EPA will still not allow discharge into the local environment, the Guam EPA is now working with the GuARNG to resolve the discharge disposal problem. This project has not been successful and has been put on the back burner. At present there is no commercial or military equipment that is portable and can remove the metals to a sufficient degree to allow unrestricted disposal into the environment. Waste still must be returned to base for processing. Its is unlikely that any portable equipment will allow the waste wash to meet Guam's unique requirement for unrestricted return to the environment.

NEXT STEP: Conduct availability study of new commercial disposal systems.

END RESULTS EXPECTED: A combination ROWPU/(MMFFS) that could meet the fluid filtration requirements of all services.

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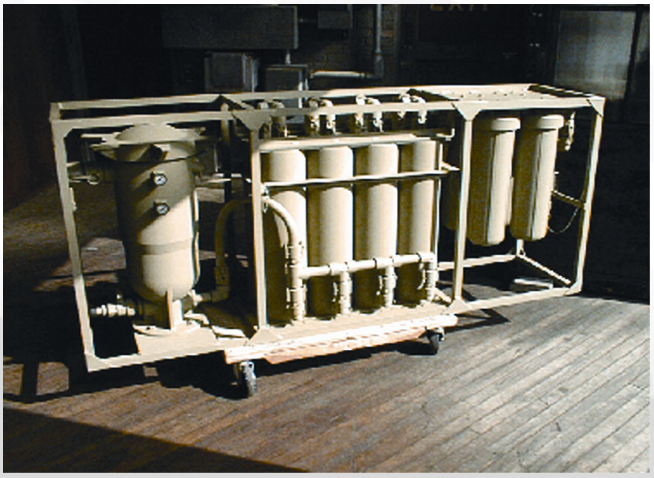

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Project Book

MOBILE ELECTRIC POWER

Mobile Power Generation for the Digital Battlefield

Project: 1017

Hawker Armasafe Plus Battery

PROBLEM: A central component of the Army's force modernization strategy is information dominance on the battlefield. To this end, the Army has fielded an array of tactical sensors, information management systems, and communication systems aboard its combat vehicles. These systems are designed to (1) develop real-time situation awareness and (2) maintain and distribute a relevant common picture to each force element. For this strategy to succeed, the Army must be able to operate these systems and networks on a 24hr/7day sustainable basis. However, recent experience with the Army's first digitized division suggests that these systems have exceeded the onboard electrical power capacities of its tracked and wheeled combat vehicles –particularly during silent overwatch or other times when the vehicles are parked. As a result, commanders are often required to choose between running their vehicle engines on a continuous basis or shutting down their digital information systems. Increased fuel consumption adds to a unit's logistics burden and, in some cases, forces the commander to shut down his critical information systems at critical points in the battle.

SOLUTION: Working with scientists and engineers from both TACOM and CECOM, the FAST Science Advisor is developing both near-term and long-term solutions to this problem. In the near-term, the Hawker Armasafe Plus absorbed glass mat (AGM) battery has been demonstrated to provide improved power storage and recharging performance over the Army's standard 6TL/6TMF lead-acid vehicle battery. Other types of batteries (*e.g.*, Lithium-Ion) are also being investigated for their utility in meeting the electrical power needs of the digitized Army. For the long-term, various types of fuel cell technologies offer promise as a replacement for the traditional diesel-powered auxiliary power units aboard combat vehicles. Although these technologies are being addressed within the context of III Corps' heavy armored forces, they each hold similar promise for the Intermediate Brigade Combat Team and for the Army's Future Combat System.

STATUS: Field evaluation of the Hawker and Sonnenschien batteries was interrupted by deployment orders for 4ID. However, through the evaluation period, both batteries performed well and were a significant improvement over existing automotive batteries. TACOM directed lab testing of the Hawker also showed promising improvements over existing battery performance. Based on the lab testing and the abbreviated field testing, 4ID and 1CD have made the decision to procure and take Hawker batteries during the deployment.

NEXT STEP: TACOM is developing a new battery specification for a "valve regulated lead-acid" (VLRA) battery – both the Hawker AGM and the gel cell fit this category. Input for this spec will be validated through additional lab and field testing being coordinated by TACOM. It is envisioned that this specification will be utilized to competitively procure the next generation of Army automotive batteries.

END RESULTS EXPECTED: (1) Demonstrated performance improvements in the Army's ability to operate its digital information systems and networks during silent overwatch with a new battery in deployed field experience. (2) Development of a new specification and competitive procurement of a new standard automotive battery for the U.S. Army. (3) Continued long-range development of future battlefield power generation systems.

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Photovoltaic Generator

Project: 1049

PROBLEM: The Army desires to reduce its dependency on fossil fuels; increase operational security by reducing noise at TOCs and command posts; and protect the environment.

SOLUTION: The Center for Army Analysis (CAA) needs additional operational evaluations on prototype photovoltaic generators in order to complete their analysis. The CAA has offered to provide two trailer-mounted generators for operational evaluation in USAREUR.

STATUS: July 2001: 127th MP Company, Hanau GE, receives the first PV (1kw) generator mounted on M105 5-ton trailer.

August 2002: Second PV generator (3kw) arrived at Ramstein.

Sept 2002: 3kw PV put at Germersheim for storage with AMC Europe's help.

January 2003: 3kw PV Demonstrated at V Corps' Victory Scrimmage in Grafenwoehr. Proved fully satisfactory. CAA provided training for the STB and SGS. CAA also upgraded the 1kw PV in Hanau to 3kw.

February 2003: Both units were deployed to Kuwait one with 127th MPs and one with STB V Corps.

NEXT STEP: Receive AARs and evaluate.

END RESULTS EXPECTED: PV generators receive trial use at USAREUR.

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Project Book

MOBILITY

Ribbon Bridge Ramp Bay Nubs

Project: 1061

(Closed)

PROBLEM: The 502nd Engineer Company (Assault Float Bridge) is damaging the ramp bays of their ribbon bridges when they strike the NATO standard river banks used for training in Germany. The training banks were constructed using either concrete or "bonestone" (German style paving stones). The most serious damage occurs when the unit conducts rafting operations carrying a heavy load (such as an Abrams tank). The two "nubs" located on the bottom surface of the ramp bay strike the concrete bank with such force that the nubs are bent and the aluminum skin of the bay is ripped open. This type of skin damage deadlines the bay on the Unit Status Report (USR).

SOLUTION: The PM responsible for the Ribbon Bridge, Mr. Jim Sutton, PM Heavy Tactical Vehicles, was contacted and requested to design and fabricate several different fixes for this problem.

STATUS: Two designs were completed. Two ramp bay sets of prototype hardware for each design are being fabricated at TACOM. The first two sets of prototype hardware were delivered to the 502nd Engineer Company on 29 May 2001 for operational evaluation.

Feb 2003: 502nd received new Assault Float Bridges which do not have nub problem.

NEXT STEP: Project is complete.

END RESULTS EXPECTED: The unit will evaluate both designs and provide feedback to the Science Advisor and the PM.

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Current ramp bay nub design (502nd Engineer Company equipment, Hanau, Germany)

Prototype hardware, designed by TACOM engineers, installed on a ribbon bridge ramp bay

OPERATIONAL SUPPORT

Camouflage Covering (Hide Site Kits)

Project: 1005

PROBLEM: Special Forces Groups are forward positioned, often inside hostile territory to gather intelligence and identify potential targets. These teams or groups consist of three to five dismounted troops and supplies and equipment for short term sustenance. The team is extremely vulnerable to detection due to visual observation or their thermal or near infra red signatures. The Special Forces is in need of a winter camouflage covering for the Hasty Hide Shelter frame that provides the same low profile camouflage as presently available for the "Advantage" pattern in summer. Also needed is a means of identifying additional patterns that can be quickly replicated and fielded to meet Special Forces deployment demands.

SOLUTION: There appears to be more than one DOD laboratory investigating camouflage issues for dismounted troops. The Special Operations Technology Development project (4.001) of the Special Operations Command is developing the Hasty Hide Shelters and the Natick Soldier Center is developing a means of rapidly producing a camouflage patterned fabric as part of their "Site Specific Rapidly Deployable Camouflage" project. The various Joint Command J2 (Intelligence) communities continuously produce surveillance photographs and other terrain topographical data within their respective "Area of Responsibility" (AOR). A conduit is required that will allow the Special Forces to define the terrain, using unclassified J2 information, to the appropriate project to have the camouflage material manufactured. A mechanism of cataloging patterns is required that will allow Special Forces to order the specifically required material in the proper configuration (shelter, uniform, etc.).

STATUS: The 1st/1st Special Forces Group (1-1 SFG(A) BN), Torii Station, Okinawa, has two sets of shelters. One set of two that replicate a summer scene and one set of two that replicate a winter scene. The summer units are being used this summer and the winter units will be tested this winter. Project is currently in a monitoring phase.

NEXT STEP: ARL has been provided typical scenes. A summer and winter pattern was delivered to the 1st/1st. The pattern is under contract.

END RESULTS EXPECTED: Furnish test samples of new camouflage kits for the "Hide Site" shelters for 1st/1st to test.

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Field Reconnaissance Vehicle (Fox) Night Sight

Project: 1064

PROBLEM: The current NDS-2 Sight on the FOX vehicle causes eyestrain under extended use, has an awkward connector location and has poor side visibility.

SOLUTION: Possible remedies include an add-on monocular or binocular attachment to minimize the eyestrain, additional DVEs on the side viewing ports for additional coverage or replacement by an alternate Night Vision system with greater flexibility. A connector elbow adapter could ease the connector location problem.

STATUS: September 2000: Discussed problems with FOX driver and with Mr. Scott Kohnke, Science Advisor at 7th ATC, at the USAREUR Symposium 2000. Met with Mr. Al VanLanduyt, CECOM/NVESD, and discussed possible solutions. Coordinated with COL Madere, V Corps Chemical Officer. Proposed a two-phase response. Phase 1 is a demo of a dual-wavelength DVE. Phase 2 is follow-on engineering activity to upgrade all the FOX vehicles. 12th Chemical Co and the 1ID was updated about this plan.

March 2001: Held a demonstration at Kitzingen (Harvey Barracks), hosted by the 12th Chemical Company. Thomas Soyka and Paul Bachelder of CECOM/NVESD provided the new hardware, installed it on the Fox vehicle and gave instructions for its use. The demo included a dual front camera (thermal and low light level capability) and a thermal-only rear camera. A tabletop demo of a modified NDS-2 was also shown. The system was exercised by all the Fox Recon drivers the nights of the 28th and the 29th, and an after-action review was held on the 30th.

January 2002: The field engineering prototype was delivered, installed on a FOX vehicle, and demonstrated at the 12th Chem Co at Harvey Barracks, Kitzingen. The system has a thermal and a low-light level camera mounted on a gimbal. The gimbal is pointed by a manual pistol-grip control handle from inside the vehicle. A flat panel display provides the driver with dual mode imagery. A third rear-facing camera (thermal only) is used for backing up. A commander's side view screen and a rear compartment view screen are also provided. No vehicle modifications were required for the installation and the system performed at 100%.

May 2002: Mr. Paul Bachelder of NVL conducted a formal training class at the 12th Chem Co Racon Platoon in Kitzingen. This completed the safety training requirements. After the training session, some damaged hardware was taken off the vehicle and hand-carried back to NVL for repairs and upgrades.

Sept 2002: Upgraded and repaired hardware was installed. Extensive trial use was begun.

Feb 2003: Had report from NVL that when 12th Chem deployed to Kuwait they removed the system and installed it on their new FOX vehicles. NVL and FOX PM considering putting the system on additional FOX vehicles. Device proves to be very valuable.

NEXT STEP: Conduct AAR at end of deployment trial use.

END RESULTS EXPECTED: An improved operation of FOX DVE.

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Helicopter Landing Pad Marker

Project: 1087

PROBLEM: SFC Walker of Range Operations requested that the Science Advisor investigate methods of marking helicopter landing pads for night and low visibility. The markers need to be visible through night vision goggles or thermal imagers. In addition to marking the pad, the pad number would be helpful and/or the ability to turn on a specific pad's marker remotely would be advantages. Since both the Grafenwoehr airfield and the forward airfield refueling point (FARP) are permanent installations, they can then run power and on/off switches for each pad controlled by the tower. The markers will probably have to be at or below ground level for safety for the objective system.

PROPOSED SOLUTION: Low power thermal resistive paper and near IR lights have potential. These can both be made into the shape of the pad number.

STATUS: CECOM/NVESD provided near IR diodes for experimentation. Mr. Scott Thomas of CECOM/NVESD demonstrated thermal panels to personnel from Range Operations, CPT Wise, and to CPT Griffin, Commander of the Grafenwoehr Airfield. Prepared a near IR numbered marker for demonstration.

NEXT STEP: Both helicopter night vision goggles and a FLIR system will be used to evaluate the effectiveness of the markers.

END RESULTS EXPECTED: The landing markers will improve the ease of locating the assigned landing pad to visiting units.

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HMMWV Auxiliary Weapon Mount (HAWM)

Project: 1027

PROBLEM: The 1/508 ABCT, has both standard and up-armored HMMWV weapon platforms. These vehicles currently mount either the TOW, or the MK19 as the primary weapon but the unit does not have the capability for mounting a second suppression/near in defense weapon for force protection in MOUT environments. The capability to simultaneously mount the SAW on the HMMWV was sought and the user recommended the Eagle Mount concept that the crews had seen/deployed in the past but the item was not currently available at SETAF.

SOLUTION: The HMMWV Auxiliary Weapon Mount (HAWM) concept, allows a HMMWV crew to mount the SAW as a second weapon at the 1900 position on the turret ring of the HMMWV weapons platform.

STATUS: Following the successful assessment of the ARL "roller design" HAWM concept during the 173rd Brigade's Spring 01 Graf training rotation, coordination with the Brigade Commander was undertaken to draft an ONS for the HAWM. Following staffing, the Brigade approved document was submitted to the SETAF Commander, MG Wagner for endorsement. The signed ONS was subsequently forwarded to DA (DAMO-RQ) and HQ TRADOC (ATCD-EP) on 29 March 2002. Meanwhile, coordination between ARL and ATC at APG, MD continues to initiate a formal Safety Release program for the ARL-developed HAWM.

NEXT STEP: Given a DA approved requirement and the completed Safety Release, it is anticipated that the PM-LTV could approve initial fielding of the ARL HAWM prototypes to the 173rd Airborne Brigade warriors in the near future.

END RESULTS EXPECTED: Light Forces will have the ability to mount the SAW as a second Weapon on the HMMWV (TOW or MK19 equipped weapons platform) thus providing the unit with a greater Force Protection capability when operating in MOUT environments.

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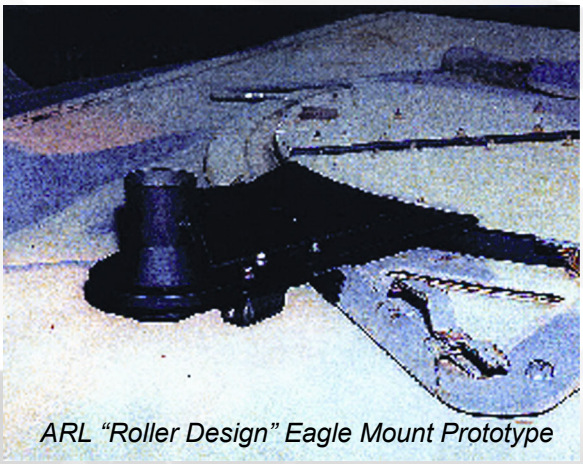

ARL "Roller Design" Eagle Mount Prototype

HAWM (Eagle Mount)
Project: 1027a

PROBLEM: Turret top HMMWVs can only mount one weapon at a time. This limits response capability in critical situations. Individual units have repeatedly solved this problem by building their own weapons mount so they can have two weapons mounted. These are collectively called Eagle Mounts. However, they are not professionally engineered. Also, each mount is specific to only one weapon.

SOLUTION: Obtain the professionally designed and engineered HAWM HMMWV weapons mount, which allows two weapons to be mounted and comes with adaptor kits for the different types of weapons.

STATUS: Eagle mounts have been fabricated by individual units since the late 80's and the first of several efforts standardize them started in the early 90's. The problem has never received full support by a PM shop, TRADOC, or as a COTs system. In 2000, the SETAF Science Advisor started a project to develop a standardized Eagle Mount. It received ARL support and a number of prototypes were built. The device, now called the HMMWV Auxiliary Weapons Mount (HAWM), was demonstrated at Ft. Benning in Sep 2002 in a simulated engagement and capture of a hostile vehicle. Currently 70 units are available for testing.

Nov 2002: V Corps received two units, one went to 1AD and other to 18th MP Bde. Awaiting the safety release.

Dec 2002: 5 units received and given to 95th MP Bn. Still awaiting safety release.

NEXT STEP: Obtain Safety Release and begin trial use.

END RESULTS EXPECTED: V Corps provides AARs and recommendations on whether V Corps adopts the HAWM for widespread use.

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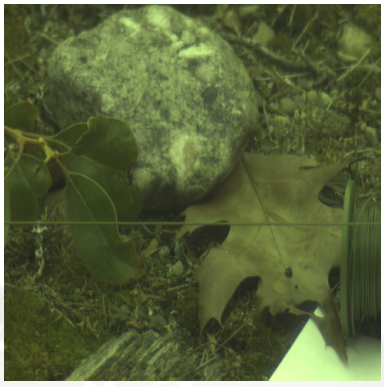
Hyperspectral Technology Application

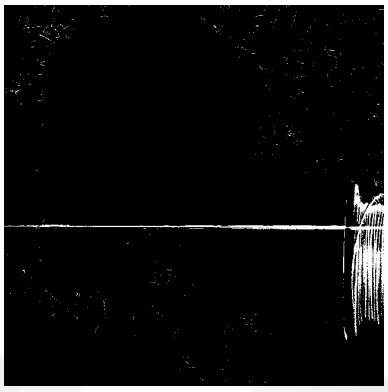
Project: 1003

PROBLEM: For the past ten years, the U.S. Army Military Police Brigade - Hawaii (USAMPB-H) has been coordinating "drug enforcement" activities with the local Drug Enforcement Agency (DEA) agents. The 25ID(L) has been furnishing OH58A helicopters and operators to the DEA so that trained DEA observers can search the Hawaiian Islands for marijuana fields. The Kiowa Warrior helicopters (OH58) have been converted from the A series to the D series. This change, and the lack of space for an observer, coupled with escalating operation costs, makes the "old" method of doing business unacceptable and unaffordable. The USAMPB-H/DEA team has looked at mechanical methods before and determined that equipment available was not acceptable.

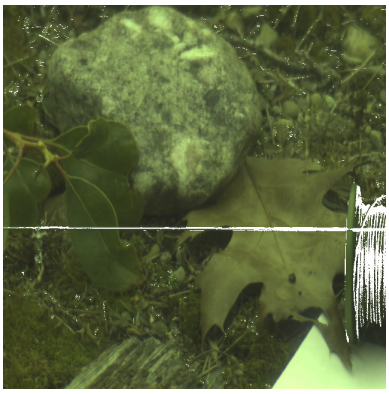
SOLUTION: There is a family of new sensors based on Hyperspectral imaging technology, that, when coupled with improved computational power, may be able to economically locate, distinguish and identify marijuana fields from other types of vegetation in a timely manner. When mounted in surveillance aircraft, a computer can store the image and location of a field. The data can then be reduced and interpreted within a few hours and eventually in real time. ARDEC has been developing a system to locate mines and trip wires using hyperspectral imaging (see example below). This system can be modified to provide the technical solution for the DEA.



Original Image



Trip Wire Found



What User Sees

STATUS: Working with USAMPB-H and the local DEA to describe the need and evaluate options for cost sharing. Initial cost estimates to demonstrate for DEA and MPs have been prepared.

NEXT STEP: Demonstrate existing system to USAMPB-H and DEA to evaluate its suitability, get feedback from users and determine way ahead.

END RESULTS EXPECTED: Economical, reliable method of detection and location of marijuana plants.

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Javelin Pedestal Mount

Project: 1047

(Closed)

PROBLEM: The 1/508th ABCT recently received 18 Javelin man-portable antitank weapon systems for deployment with the 173rd Airborne Brigade. The initial firings of the Javelin by the unit at the Grafenwohr Training Area in Germany were from ground positions and demonstrated the impressive capability offered by this rugged infantry system. Recognizing the need for greater mobility however, the Brigade commander requested assistance from the AMC-FAST Science Advisor in coordinating the procurement of prototype Javelin vehicle-pedestal mount systems for field evaluation.

SOLUTION: In coordination with the Science Advisor, MG Wagner, SETAF CG, initiated an endorsement of the Javelin Pedestal Mount concept through the CG, US Army Infantry School (ATTN: TRADOC System Manager for Anti-Tank, Fort Benning, GA.) indicating that a vehicle pedestal mount for Javelin was an essential item of equipment for the 1/508th ABCT which uses HMMWVs as weapons platforms. The mount would provide greater gunner stability, long-term command launch unit (CLU)-based RSTA and faster more mobile anti-armor engagements

STATUS: The SETAF Science Advisor arranged with the PM Javelin Project Office Engineering Division for the delivery of three prototype Javelin Pedestal Mounts in time for evaluation during the Brigade's Spring 01 Grafenwohr training rotation. Equipment was installed on 1/508th ABCT weapon platforms and evaluated as part of the Fall 01 and Spring 02 Grafenwohr live-fire training exercises. As part of this evaluation, and in conjunction with the PMO, a Utility and Functionality survey was developed for the item to be administered to the gun crews to capture user feedback on the Pedestal Mount design Utility and Functionality. The results of these user surveys indicated that the prototype mount was highly effective especially in allowing the gunner to deploy the Javelin CLU in the target surveillance mode for long periods of time without fatigue.

NEXT STEP: Data collected during these evaluation periods was provided as direct user input to the Javelin PMO. The prototype mounts will remain with the Brigade for continued deployments. This project is considered successfully closed.

END RESULTS EXPECTED: As expected, these live-fire field evaluations assist the Army in in establishing the utility and functionality of the mount concept as having positive effects on critical gunner task performance.

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Landmine Detection Technology

Project: 1044

(Closed)

PROBLEM: MP Battalion deployed in Kosovo needs better mine detection capability. MPs often need to travel "off-road" in areas suspected of having land mines.

SOLUTION: Search commercial and military community for latest land mine detection technology and provide V Corps with demonstration of candidate systems.

STATUS: Commercial search was not productive. Contacted office of PM Mines Countermines and Demolitions (MCD) MAJ Dan Guilford, Countermine Division located at Ft. Belvoir, VA, provided information on all of their systems. Following review of information provided V Corps, arrangements were made for PM MCD demonstration in V Corps.

September 02: Demonstration of HSTAMIDS mine detector was held at PHV, Heidelberg on 23 Sept. Present were: SCSENGR USAREUR, staff from 130th Eng Bde, Asst. PM Countermine, Office of the Project Manager for Close Combat Systems, ARL Human Research and Eng. Directorate, the inventor from Carnegie Mellon Univ., and the president from the company that made the device.

NEXT STEP: Project is complete.

END RESULTS EXPECTED: V Corps Staff will be knowledgeable of latest mine detection technology and systems.

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Mapping System
Project: 1034

PROBLEM: Forces Command (FORSCOM) Operations Center needs to quickly import maps, geo-reference operations, and disseminate this information to other command centers.

SOLUTION: Identify a geographic information system (GIS) and other associated mapping products to meet the Operations' Center requirements.

STATUS: A GIS (made by ESRI) was specified and acquired. Appropriate FORSCOM staff have been trained in its use. FORSCOM has acquired a server to host map information. This initiative has been briefed to the FORSCOM Chief of Staff, and has received Command Group support. Visits were arranged for FORSCOM staff to: National Imagery and Mapping Agency (NIMA), US Geological Survey (USGS), US Army Topographic Engineering Center (TEC), Central Intelligence Agency (CIA) Operations Center, and Federal Emergency Management Agency (FEMA) Military Support Operations Center. FORSCOM seeks to include its mapping capability into an enterprise-wide data warehousing system.

This mapping capability highlighted the need for imagery to support operations (particularly for disaster relief). We have helped FORSCOM get a Sky Media system with assistance from TEC and NIMA.

NEXT STEP: Although FORSCOM has added to the GIS we provided, it still does not provide the full enterprise capability that the command needs. Using the experience gained with this mapping system, FORSCOM staff is preparing a specification for an enterprise electronic mapping system. Members of G-6 have requested funding from FORSCOM leadership.

END RESULTS EXPECTED: Maps and imagery are useful to other elements of HQ, FORSCOM (e.g., environmental engineers, installation managers, training centers, and military support to civil authorities). We hope to develop a capability that is useful to all of this community.

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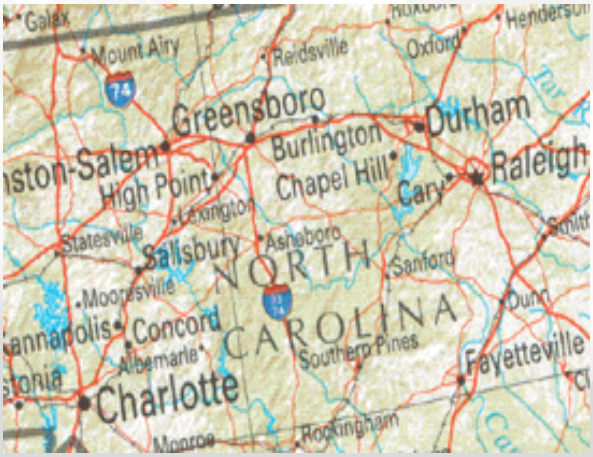

Map of North Carolina with road network, place names, and water bodies overlaid.

SOLDIER SUPPORT

Commercial Arctic Water Bottle Carrier

Project: 913

(Closed)

PROBLEM: The existing arctic canteen has several performance problems and Natick (SBCCOM) has set out to provide a new one. Some of the shortcomings of the existing arctic canteen are:

1. It only has a canvas cover, which is not insulated.
2. It is heavy.
3. The cap is not NBC compatible.
4. The cap has a stopper design, and is not leakproof in all situations.
5. The case is a double-wall design (like a thermos bottle), and if dented (during parachute landings) the outside wall contacts the inner wall, defeating the insulating value.
6. If frozen and placed on a stove to thaw the double wall will rupture.
7. It has a small neck and freezes there first, and is too small to break ice out of the neck with a bayonet.
8. It cannot be carried upside down in the carrier, so it freezes from the top down.

SOLUTION: Develop a performance specification, type classify, evaluate and compete for production.

STATUS: Several versions of commercially available (non-developmental item) plastic water bottles (Polyethelyne, Polycarbonate) have been evaluated in Alaska over the past 6 years. The U.S. Marine Corps plastic wide mouth cold weather canteen was also evaluated during NE00, but it leaked badly. Natick issued a performance requirement in 1999 that the canteen contents remain 80% liquid for 4 hours at –40F for a re-heatable canteen and 30 hours at –40F for a non-heatable canteen. There was only one company that responded, it supplied a single wall stainless steel canteen. A manufacturer was put under contract 1 December 1999 to make a canteen to be used with the existing insulated cover and cup already delivered to USARAK. This project was briefed to General Coburn, CG AMC, during his August 2000 visit. The USARAK position is consistent with the Infantry Center requirement to have a canteen, which could be thawed on a stove if frozen. Prototype was delivered in January 2001. The new commercial artic water bottle (arctic canteen) is in the USARAK supply system and currently in use by soldiers. It works well and has met all requirement.

NEXT STEP: This project is complete.

END RESULTS EXPECTED: A Canteen that meets Infantry School Requirements.

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Extreme Cold Weather POL Handlers Glove

Project: 1046

BACKGROUND/PROBLEM: Existing Petroleum, Oils and Lubricants (POL) Cold Weather Gloves were designed to a requirement of -25°F. Soldiers work and train in an arctic environment where temperatures are routinely -30°F, with -65°F occurring every winter. When fuel handlers grab a metal fuel nozzle or valve that is cold soaked at -65°F, the cold penetrates the gloves and frost-nip will result, or even frostbite if the exposure is prolonged.

PROPOSED SOLUTION: Provide an Extreme Cold Weather POL Glove (ECWPG) that will protect the soldier's hands from POL and the cold, even when ambient temperatures are -65°F. Research from the original glove qualification indicates that the three-finger design is optimal for warmth and dexterity, therefore that should be a consideration in glove selection.

STATUS: The users (4/123 Aviation Battalion) and Central Issue Facility (CIF) were surveyed about the existing POL Cold Weather Gloves. The project engineer for gloves at SBCCOM was contacted for solutions and assistance, a market survey had been done but despite manufacturers claims a suitable glove was not found. The shortcoming was addressed at the Cold Weather Military Operations Working Group (CMOWG) meeting in March 1999.

NEXT STEP: Submit Tech Connect request for information and possible solutions. Submit the need for a new/improved glove to the CMOWG. Draft an Operational Needs Statement (ONS) documenting the requirement for a new/improved glove. Obtain the test plan from the POL Handler's Cold Weather Glove and update it for -65°F and submit to TECOM.

END RESULTS EXPECTED: A POL Handler's Extreme Cold Weather Glove that can protect the soldier's hands from POL and the cold, even when ambient temperatures are -65°F.

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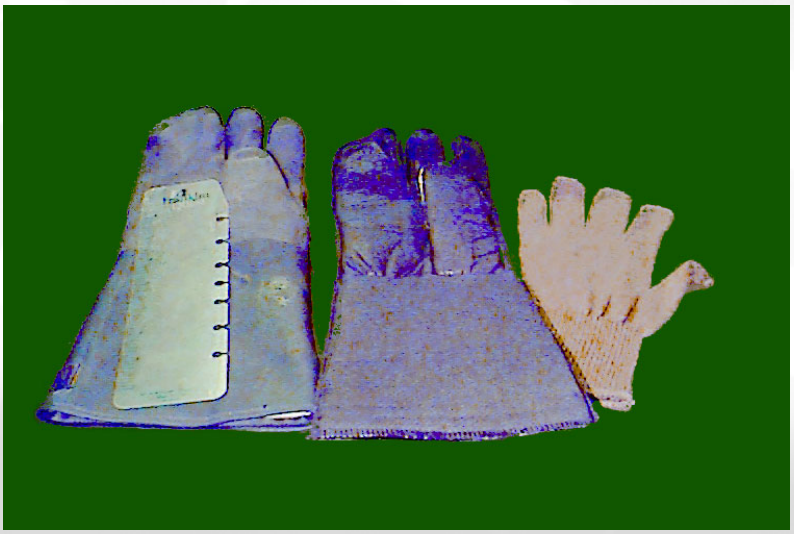

M240 B Ammunition Bag Re-Design

Project: 972

PROBLEM: The Bde/Bn crew-served heavy weapon squad members identified problems with the Army's current ammunition bag design. In FY 99, COTS items were procured for subsequent field trials by Alpha-Company, 1/508th ABCT. A report from the unit again found shortcomings with the standard Army design as well as the COTS items. Follow-on discussions with COL Yarbrough, Commander, 173rd AB, indicate that the Ammunition Bag issue is critical and a solution is deemed a high priority.

Subsequently, in coordination with key 1/508th & 2/503rd NCOs, a concept for a new ammunition bag was developed and drawings were forwarded to London Bridge Trading Company (LBTC) and Safety Systems Corp (SSC) for review. Fabrication of prototype bags per the unit specifications would initiate a test-mod-test cycle that should culminate in the development and fielding of an effective solution.

STATUS: Coordination with the LBTC and SSC indicated that prototypes (similar to the concept drawings provided) could be fabricated given "seed" funding. Any additional modifications deemed critical as a result of the user evaluations would be undertaken for subsequent re-evaluation.

NEXT STEP: Both LBTC and SSC will fabricate the prototype bags for follow-on field evaluation. It is expected that each company will develop different prototype designs in an effort to address the "objective bag" capabilities outlined in the concept drawings. Upon receipt of the prototypes, field evaluations will be undertaken and a Usability & Functionality Survey instrument will be developed and administered as a means of collecting user feedback on the prototype bags for direct input back to each vendor for possible modifications. Ultimately, the results of this effort will be provided back to the Infantry School at Ft Benning as input to a possible SEP program initiative.

END RESULTS EXPECTED: An ammunition bag design for M240 MG systems will be developed thru a series of test/modification/test trials until an acceptable design is produced. Following the successful conclusion of this effort, the product and associated specs will be provided to the Infantry School for possible Army-wide fielding under a SEP initiative.

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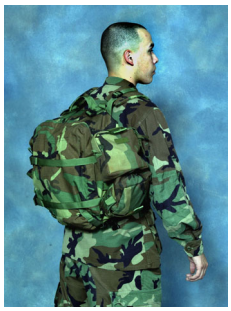
Medic Jump Packs
Project: 891

PROBLEM: The Bde/Bn medics identified a problem with current medic bag (Thomas bag) and requested a bag specifically adapted for Airborne operations. Two Jumpable Medic bags were procured in FY 1998 from London Bridge Trading Co (the LBT-1562A & LBT-1562E) and issued to the SETAF medical units for field evaluation. Initial field evaluation of these items identified shortcomings associated with jumping operations where the LBT packs do not provide space for BOTH medical and personal gear. A formal AAR was conducted with 12 key Brigade/Bn medic personnel (officers and NCOs) on specific design shortcomings of the current mix of medic bags being deployed. Additionally, a Usability/Functionality questionnaire was developed and administered the results of which indicated that no current medic bag concept provides space for BOTH medical and personal gear. Thus on the drop zone, the Medics have their required medical gear, but lack substantial personal gear for sustained operations.

SOLUTION: In follow-on AARs and meetings with the senior Medic Officers and NCOs it was suggest that either the US Calvary CO's ALICE Ruck Sack and possibly the new MOLLE, might meet the medics' requirement by providing space for BOTH medical and personal gear.

US Calvary's CO's Enhanced Large ALICE Ruck Sack



Medic version of PM Soldier Equipment's MOLLE

STATUS: Coordination with the MOLLE system POC (Mr. Al Doassonville) at the PM-Soldier Equipment Office was initiated regarding receipt of the "Medic" variant of MOLLE for unit evaluation. Subsequently, a Medic MOLLE system was received and was reviewed by the Brigade Medical Staff. Due to design constraints identified, the Medic version of the MOLLE pack ($500.00 each), was deemed not to meet the Medic's space requirements. (Also noted was the Marine Corps Times February 18, 2002 article titled "Pack Of Trouble: How the new and improved MOLLE pack went into combat and came apart at the seams" where the MOLLE received poor marks for utility and durability.) Additionally, in coordination with the ARL-HRED field Office at Ft Bragg, contact was made with SFC Lenser at the USASOC Surgeon's Office where requirements for SOF medical gear are developed. Discussions indicated that the current Medic Packs employed by the SOF would not meet the SETAF user requirements. Finally, follow-on discussions with COL Yarbrough, Commander, 173rd AB indicate that the Medic Jump Pack issue is critical and a solution is deemed a high priority.

NEXT STEP: Purchase 16 of the US Calvary CO's ALICE Ruck Sack for evaluation by both the 1/508 ABCT and the 2/503rd ABCT "line medic" staff.

END RESULTS EXPECTED: An acceptable Medic Jump Pack system will be identified.

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Arctic Heaters
Project: 881

BACKGROUND/PROBLEM: TACOM is recommending the use of the Webasto Heaters for the HMMWV vehicles for SBCT-3. USARAK DOL contends that the Espar heater is more reliable, easier to install and is less expensive. Espar has been tested at CRTC and has shown good results.

PROPOSED SOLUTION: To review and evaluate the justification for using the Webasto or Espar heaters for SBCT-3 vehicles in Alaska.

STATUS: The project to replace swingfire heaters by commercial heaters was initiated by the previous SA, in 1998-99. Two heaters sources, Webasto and Espar were solicited to provide the heating kits for testing and evaluation. Espar kits were installed on some of the vehicles and Webasto heaters were installed on some of the others. The results showed Espar to be more reliable and met the requirements better than the Webasto. However, PM LTV is purchasing the Webasto heaters. PM LTV contends that Espar was never a candidate heater. Now other issues have been raised by PM with Espar such as no EMI test have been done and that the installation has a potential interference with C4ISR equipment. This is presently being looked at by the USARAK SA and DOL maintenance. The Webasto costs $3868 and Espar is $1800. The Webasto takes 12 hours to install, Espar 6 hours. EMI results for Espar exist and were provided to PM LTV.

NEXT STEP: Work with PM LTV, TARDEC, USARAK DOL, TACOM and BCC C4ISR systems at Ft Lewis to resolve this issue. Work out on a solution that resolves the C4ISR interference issue.

END RESULTS EXPECTED: A cost saving of $1.8M will result if Espar heaters are installed.

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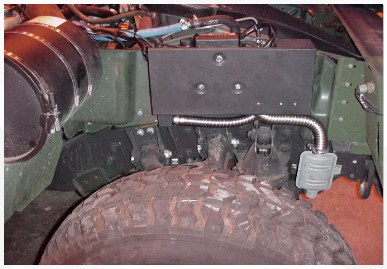
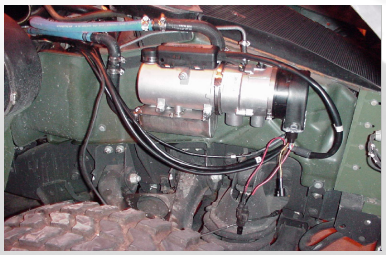
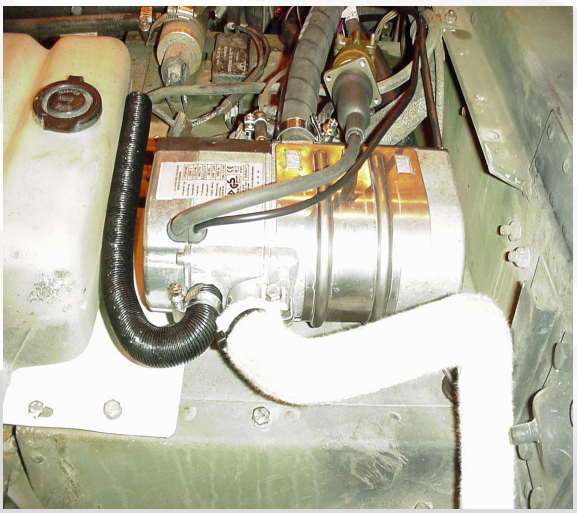
Webasto





Espar



TRAINING

BMP Flash/Bang Simulator

Project: 1081

PROBLEM: Mr. Dan Hoeh, Director of Training Analyst Computer Simulation Systems at the Combat Maneuver Training Center (CMTC) sent an e-mail to Mr. Scott Kohnke and STRICOM requesting that we investigate improving the realism of the Opposition Force (OPFOR) BMP Surrogate Vehicle. It currently does not have a flash or sound simulator for the 7.62 machine gun. A flash/bang simulator would provide a realistic battlefield effect and alert Blue Force troops that they are being fired at.

PROPOSED SOLUTION: Develop a low cost flash/bang simulator as an interim solution until the OPFOR Surrogate Vehicle is fielded at CMTC.

STATUS: STRICOM recommended that the Science Advisor develop a low cost system and that they would continue their efforts on the Opposing Forces Surrogate Vehicle. Investigated modifying Opposing Forces Surrogate Vehicle simulator developed by ARL. The ARL equipment uses a high powered audio system to replicate the 7.62 machine gun. This system was designed to do a number of MILES functions that are not required at CMTC. Due to the cost and the complexity of modifying this equipment this technology was not pursued. NVESD has developed a inexpensive design that will meet the requirement. This equipment was demonstrated in April 02. NVESD demonstrated a system that is mounted on the BMP and integrated with the MILES equipment in November 02.

NEXT STEP: Conduct another demonstration of ruggedized equipment based on the requirements of CMTC.

END RESULTS EXPECTED: Improved realism for MILES Force on Force training. STRICOM will be provided the design for potential use in the Opposing Forces Surrogate Vehicle.

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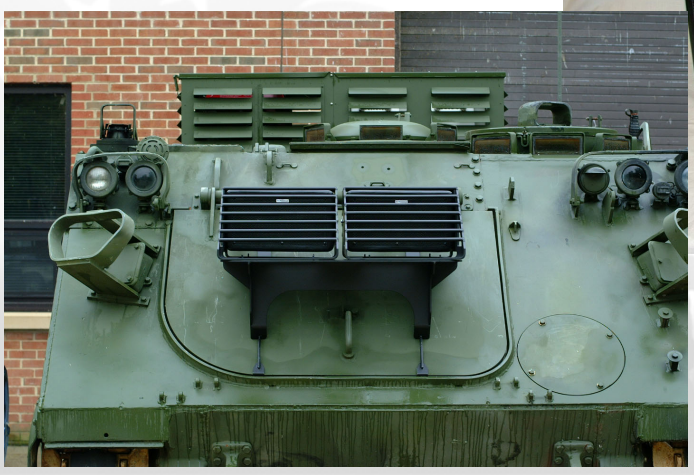

Deployable AAR System

Project: 1080

(Closed)

PROBLEM: The Deployable Operations Group (DOG) has requested support in the development of a deployable gunnery training video system. This will be used to record M1 and Bradley gunnery training at remote locations and to support training for units involved in contingency operations. This system can also be used for recording remote training exercises such as Victory Strike.

PROPOSED SOLUTION: Develop a portable thermal recording system. The system will include a thermal camera with electronically controlled pan & tilt, control/recording box and AAR playback monitor.

STATUS: NVESD demonstrated the Grafenwoehr Range Evaluation System (RES) and a NVESD developed CMTC combat camera system to the DOG. Using this as a starting point, NVESD provided a proposal that met the DOG's requirements. NVESD let a contract to procure a commercial 8-12 micron thermal camera. The system has been delivered to the DOG.

NEXT STEP: NVESD will provide additional training and maintenance support. This project is closed.

END RESULTS EXPECTED: Improved M1 and Bradley gunnery training.

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Distance Learning
Project: 1033

PROBLEM: Forces Command G3 hosts a joint school for Multiple Tactical Digital Information Links (Multi-TADIL). The Multi-TADIL School has limited staff and a growing student population. A means of effectively instructing students at remote sites over a variety of bandwidth options is needed.

SOLUTION: FORSCOM G3 staff conducted an initial study on the effectiveness of low bandwidth distance learning equipment. This experiment was done from Ft. McCoy, WI and included sites at Ft. Hood and Ft. Leavenworth. It proved the feasibility of using T.120 (NetMeeting) data sharing with bridge telephones for voice. Based on ideas developed by this experience, a configuration of distance learning equipment was specified, purchased, and delivered. This equipment allows distance learning over scalable bandwidth options (up to 128 Kbps).

STATUS: Multi-TADIL School staff have been using the equipment and are beginning to incorporate it into their teaching regimen. Security problems with remote location firewalls have been an issue, and FORSCOM G6 has agreed to help. ISDN lines are being installed to take full advantage of the equipment's capabilities.

NEXT STEP: FORSCOM Training Support Center (TSC) will be acquiring video servers. We want to couple this equipment with these video servers for course dissemination. The Multi-TADIL School made distance learning a key requirement in their new support contract. Their current contractor team is using their technical skills (and some of our equipment) to prepare courseware.

END RESULTS EXPECTED: We recently arranged a visit to the Advanced Distributed Learning Co-Laboratory for Multi-TADIL School staff. Expectation is that the latter will use the Co-Lab's Shareable Content Object Reference Model (SCORM) to develop distance learning courseware.

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Soldiers at Ft. Hood, TX receiving instruction from a teacher at Ft. McCoy, WI.

Interim MOUT Instrumentation

Project: 1019

(Closed)

PROBLEM: Due to a lack of instrumentation, Hohenfels' ability to provide a through AAR is currently inadequate. The lack of documentation of actual training exercises creates subjective After Action Reviews (AARs). The goal of this effort is to provide an interim capability for the next 5-6 years before the objective plan of MOUT modernization is completed.

PROPOSED SOLUTION: Develop a video and audio system to unobtrusively record MOUT training. This will include a variety of cameras such as low light, low cost FLIRs and exterior pan & tilt systems. Critical to this will be a central camera control and switching system.

STATUS: NVESD conducted a survey of the facility to determine the instrumentation required. A demonstration of cameras and a surrogate control & switching system was completed in June 2000. STRICOM has used this data to help develop the long term system requirement when future funding becomes available. As an interim solution NVESD provided a variety of cameras and a control & switching system. In addition to providing an immediate capability, this will help define future CMTC's requirements.

NEXT STEP: STRICOM has received funding to partially instrument the Ubungsdorf MOUT site. The Science Advisor will assist CMTC in selecting equipment. Since this is now a STRICOM program it is being closed as a FAST project.

END RESULTS EXPECTED: Provide an interim MOUT AAR capability and to provide input for the objective instrumentation system.

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Series 300 FLIR

Moving Target for Artillery

Project: 1042

PROBLEM: The only targets available to Artillery Forward Observers (FOs) during live fire field artillery training at Grafenwoehr are stationary targets. FOs need to train on calling in artillery fire on moving targets.

PROPOSED SOLUTION: The planned approach is to develop a semi-expendable system using many low cost stationary target simulators (e.g. infrared markers, thermal markers). The target simulators would be sequentially turned on and off to simulate a moving target at a given speed and direction.

STATUS: NVESD has procured electrically resistive sheet to determine the required thermal target size. They are also researching commercially available sequential controllers.

NEXT STEP: Experiment with different target sizes. Procure lights as an alternative to thermal panels as a lower cost solution. Procure controller.

END RESULTS EXPECTED: Improve our artillery's ability to target threat moving targets by improving the forward observer's training.

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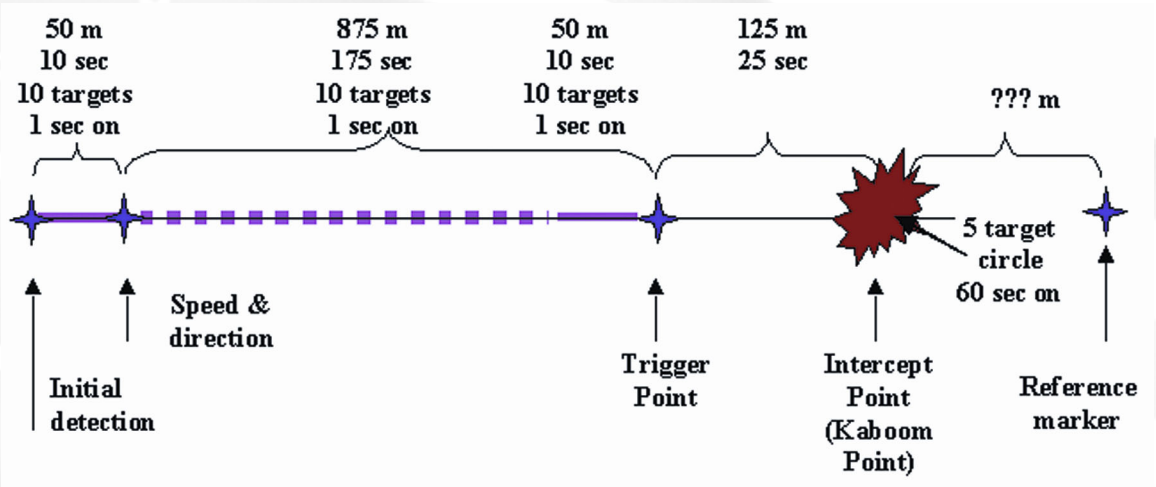

Portable AAR System

Project: 1041

PROBLEM: After-Action-Reviews (AARs) are an important part of any Army training exercise. Currently, the Observer/Controllers (O/Cs) can only provide an account of their view of live fire exercises during the AAR. Many of the details are lost. There is currently no visual or audio account of the exercise to record the individual soldier's and unit's actions for later review.

PROPOSED SOLUTION: Providing a visual and audio recording of the training will allow the soldier and unit to see where their tactics, techniques and procedures can be improved. NVESD will use lessons learned from other 7th ATC video projects to develop a portable video/audio AAR system. The system will be designed primarily for use during Live Fire Infantry Assault and Shoothouse training. However, it will be flexible enough to be used for recording other training such as TOW firing, howitzer crew training, etc.

This project will concentrate on the development of a recording/control box and on evaluating close-in camera/sensor types. It will include RF video transmitters to allow remote cameras and to ease installation by not requiring hardwiring. During the project, other cameras such as NVESD's Observer Controller (O/C) man-pack system for the O/C following the platoon (individual feedback), a battle overview recording camera (unit feedback) and an opposing force view camera (attack perspective) will be evaluated.

STATUS: NVESD demonstrated the equipment at the 7th ATC Master Gunners conference. Mr. Mike Golden, the SETAF Science Advisor, arranged for a demonstration at the Vicenza Shoothouse. SETAF is interested in procuring a system. NVESD demonstrated the system to the V Corps Provost Marshall's Office. They have deployed the system to Kuwait.

NEXT STEP: NVESD will deliver the next system to the 7th ATC.

END RESULTS EXPECTED: The goal of this project is to provide a prototype of a universal Portable AAR System that can be used for training throughout the Army. This system will enhance the soldier's After Action Review by providing them with a video and audio recording of their actions.

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PSS-12 Detector Head Tracking System

Project: 1055

(Closed)

PROBLEM: The probability of detecting low metal mines is extremely low when employing school-approved techniques and procedures (T&Ps) for the currently fielded PSS-12 mine detector. The PSS-12, and the recommended T&Ps, were not designed for the detection of low metal mines currently in use by third world nations. Researchers from the Army Research Laboratory and Carnegie Mellon University developed a new PSS-12 mine detection training program using a Detector Head Tracking System composed of commercial off-the-shelf (COTS) components. Demonstrations of this two-dimensional system for recording exact, time-tagged detector head locations have shown an increased capability to train soldiers at Ft. Leonard Wood, MO. Further research and demonstrations are needed to substantiate or revise the T&Ps based on the results of training in more realistic environments, such as those with varying types of soil, vegetation, terrain, and metallic clutter.

SOLUTION: Conduct demonstrations and training research studies that employ the PSS-12 Detector Head Tracking System at Ft. Polk, LA - since the post has sandy and clayey soils (non-laterite and laterite), has varying vegetation and terrain to simulate the environments of Bosnia, Kosovo, and other potential areas of deployment. Fort Polk also has varying weather conditions (such as temperature, humidity, and amount of rainfall) which can affect the PSS-12's capability. Furthermore, Ft. Polk is an ideal place to conduct such demonstrations and training programs using the PSS-12 and the Detector Head Tracking System because a part of JRTC's mission is to train active duty, reserve, and national guard soldiers with the latest mine detection equipment being operated via approved techniques and procedures (T&Ps). [The new T&Ps for using the PSS-12 have been approved by the Director of Training Development, U.S. Army Engineer School, Ft. Leonard Wood, MO.]

STATUS: The AMC-FAST Science Advisor at Ft. Polk met with Fort Polk personnel to include: COL Gregory Lynch, Warrior Brigade Commander; COL Terry Wolff, 2nd Armored Cavalry Regiment Commander; LTC Roy Krueger, G3, Director of Plans, Training, Mobilization, and Security; MAJ Gary Milner, XO, 519th Military Police Battalion Mr. Dave Hill and MAJ Tommy Mize, Operations Group, JRTC; MAJ Robert Lowe, S3, 519th MP Battalion; and Mr. John Costa, Safety Officer) to discuss the potential PSS-12 training demonstrations. All expressed support for the project. AMC-FAST HQ approved this project and is currently funding the efforts of two researchers from Army Research Laboratory's Human Research and Engineering Directorate (ARL-HRED) and from Carnegie Mellon University.

The AMC-FAST project related to the demonstration of a Sweep Monitoring System (SMS) at a mine detection seminar and the use of the SMS during a week-long, train-the-trainer session at Fort Polk, LA has been completed. The SMS is a training device that gives instant feedback to soldiers who are learning proper search techniques for various mine detectors (PSS-12, HSTAMIDS, MineLab, etc.). The feedback consists mainly of video presentations, graphical presentations, and audio signals which give information concerning gaps in sweep patterns, actual heights above ground of detector heads, speed of sweeps, percentages of the areas in search lanes actually swept, etc. Such feedback helps soldiers refine their search techniques in a timely manner and in a safe environment.

The SMS was developed by researchers at Carnegie Mellon University via a grant from the U.S. Army Research Office. The system has been turned over to STRICOM for further development (improved software, improved man-machine interfaces, and ruggedization). Therefore, this AMC-FAST project is closed.

NEXT STEP: This project is complete.

END RESULTS EXPECTED: a) Data to substantiate or refute the training utility of the PSS-12 Detector Head Tracking System when used in realistic environments; b) Data to validate or revise the PSS-12 T&Ps recently developed by Dr. Alan Davison and Dr. James Staszewski, and c) FORSCOM and TRADOC soldiers proficient in using up-to-date T&Ps for operating the PSS-12 in low metal and high metal mine fields.

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Threat Countermeasures (TLOS)

Project: 1028

(Closed)

PROBLEM: Currently, force-on-force training conducted at the Combat Maneuver Training Center (CMTC) does not include the deployment of countermeasures (CM) to our weapon systems by the opposing force. Numerous countries have developed CM that we can expect to see on the battlefield. This project is an effort to begin preparing our soldiers to fight in this new operational environment.

PROPOSED SOLUTION: Demonstrating the Tracking Location Observation System (TLOS) is the first step in integrating existing countermeasures into force-on-force training. TLOS is an optical countermeasure device used to locate enemy optics (snipers, vehicle, FO). The 7th ATC Science Advisor and the CMTC staff are working with the Precision Guided Weapons Countermeasures Test and Evaluation Directorate (PGWCM) to incorporate additional countermeasures into future USAREUR training rotations.

STATUS: NVESD has agreed to demonstrate the TLOS. Assisting in planning for use of countermeasures in Victory Strike and future training at CMTC.

NEXT STEP: Assist PGWCM in arranging for countermeasure incorporation into a future training rotation. Since the Science Advisor is only assisting on this effort, it will be closed as a project.

END RESULTS EXPECTED: Prepare soldiers for Countermeasures in use by enemy forces.

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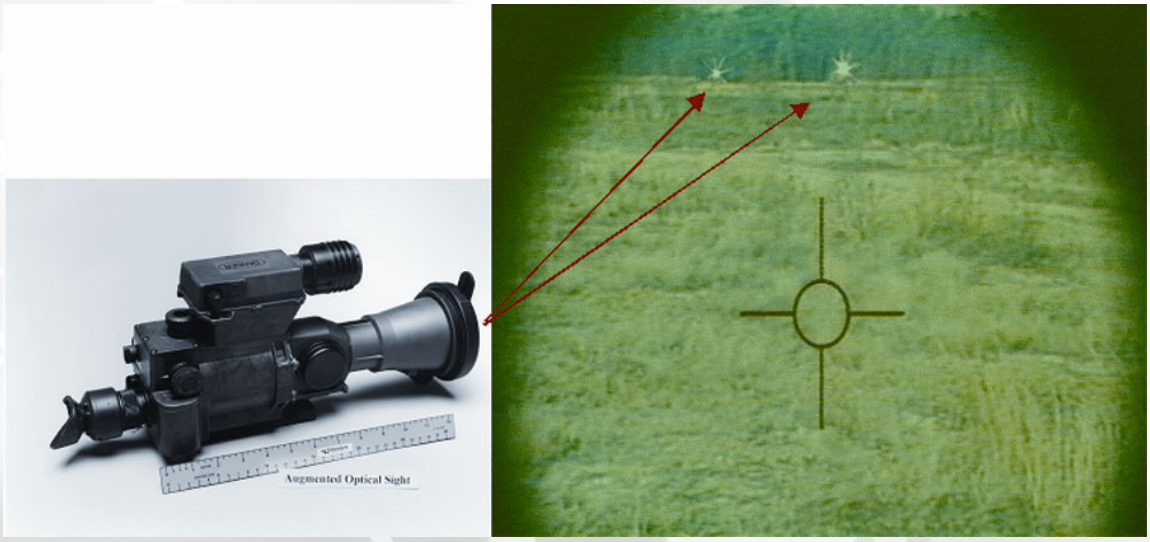

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